



**Course Syllabus**  
**According to JORDAN National Qualification**  
**Framework (JNQF)**

**Course Name: Compiler Design**

**Course Number: 06054158**

### General Course Information:

Course title	Compiler Design
Course number	06054158
Credit hours	3 credit hours
Education type	Face-to-Face (3 hours)
Prerequisites/corequisites	Computation theory (605335)
Academic Program	Computer Science
Program code	605
Faculty	Faculty of Information Technology
Department	Computer Science
Level of course	3rd year
Academic year /semester	2021/20222 Second Semester
Awarded qualification	Bachelor (Bsc)
Other department(s) involved in teaching the course	None
Language of instruction	English
Date of production/revision	18/3/2022

### Course Coordinator:

Coordinator's name	Dr. Ayad Tareq Imam
Office No	4154
Office Phone extension number	
Office Hours	10-11 Sunday, Tuesday; 11:00-12:30 Monday
Email	alzobaydi_ayad@iu.edu.jo

### Other Instructors:

Instructor name	
Office No	
Office Phone extension number	
Office Hours	
Email	

### Course Description (English/Arabic):

English	<i>Introduction to compiling, lexical analysis, symbol tables, parsing, syntax-directed translation, type-checking, run-time organization, intermediate code generation, code optimization</i>
Arabic	مقدمة في التجميع والتحليل المعجمي وجداول الرموز والتحليل والترجمة الموجهة نحو بناء الجملة وفحص النوع وتنظيم وقت التشغيل وإنشاء الكود الوسيط وتحسين الشفرة

### Textbook: Author(s), Title, Publisher, Edition, Year, Book website.

Alfred V. Aho, Monica S. Lam, Ravi Sethi, and Jeffrey D., Ullman, Compilers: Principles, Techniques, & Tools, 2nd edition, Addison-Wesley, 2007
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**References: Author(s), Title, Publisher, Edition, Year, Book website.**

1. Keith Cooper Linda Torczon, Engineering a Compiler, Morgan Kaufmann, Elsevier, 2012
2. Michael L. Scott, Programming Language Pragmatics, 4th Edition, Morgan Kaufmann; 4th edition (December 25, 2015)
3. Terence Parr, Language Implementation Patterns: Create Your Own Domain-Specific and General Programming Languages (Pragmatic Programmers), Pragmatic Bookshelf; 1 edition (January 10, 2010)

**Course Educational Objectives (CEOs):**

1.	Introduce the basic ideas about the principles of compiler designing algorithms and the structure of compilers.	
2.	Explain the basic techniques used in compiler construction such as lexical analysis, top-down, bottom-up parsing, context-sensitive analysis, and intermediate code generation.	
3.	Illustrate the basic data structures used in compiler construction such as abstract syntax trees, symbol tables, three-address code, and stack machines.	
4.	How to design a compiler for a defined language grammar using software engineering approach.	
5.		

**Intended Learning Outcomes (ILO's):**

	Subject Intended learning outcomes (ILOs) describe what students are expected to know and be able to do at the end of the course. These outcomes are related to the knowledge, skill and competence that students acquire:	Relationship to CEOs	Contribution to PLOs	Bloom Taxonomy Levels*	Descriptors**
<b>A</b>	<b>Knowledge and Understanding:</b>				
A1	Understand what compilers are	1,2	a, b	Knowledge	k,s
A2	Know the fundamental strategies of developing compilers	2	a	Synthesis	k
A3					
<b>B</b>	<b>Intellectual skills:</b>				
B1	Distinguish between the tasks of different compilers' processes	1,2	a, b	Comprehension	k,s
B2	Distinguish between compilers' processes	4	b	Synthesis	s
B3					
<b>C</b>	<b>Subject specific skills:</b>				
C1	Explain lexical techniques.	1,2	a, b	Knowledge	k,s
C2	Explain syntactical techniques	4	a, b	Analysis	k,s
C3					
<b>D</b>	<b>Transferable skills:</b>				
D1	Manage the required resources for compiler project	2,3	c, f	Application	c,s
D2					
D3					

**\*Bloom Taxonomy Levels**

Level #	1	2	3	4	5	6
Level Name	Knowledge	Comprehension	Application	Analysis	Evaluation	Synthesis

**\*\* Descriptor (National Qualification Framework Descriptors): K: Knowledge, S: Skill, C: Competency.**

**Program Learning Outcome (PLOs):**

Program Learning Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviours that students acquire as they progress through the program. A graduate of the (Computer Science) program will demonstrate:		Descriptors**		
		K	S	C
1	Analyse a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.	√		
2	Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline		√	
3	Communicate effectively in a variety of professional contexts.			√
4	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.			√
5	Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.			√
6	Apply computer science theory and software development fundamentals to produce computing-based solutions. [CS]		√	
7				
8				
9				
10				
11				

**\*\* Descriptors according to the national qualifications framework (K: knowledge, S: skill, C: Competency)**

**Weekly Schedule (please choose the type of teaching)**

☐ Face to Face

☒ Hybrid (2 Lectures Face – To - Face +1 Lecture Asynchronous)

☐ Hybrid (1 Lectures Face – To - Face +1 Lecture Asynchronous)

☐ Online (2 Lectures Synchronous +1 lecture Asynchronous)

Week	First Hour (F2F)	Second Hour (F2F)	Third Hour (F2F)	Ach. ILOs	Ach. PLOs	Descriptors**
1	Introduction to Compiler	Introduction to Compiler	Introduction to Compiler	Introduction to Compiler	a	k
2	General Overview	General Overview	General Overview	General Overview	b	s

3	Regular Expression	<b>Regular Expression</b>	Regular Expression	Regular Expression	<b>b</b>	<b>S</b>
4	Regular Expression	<b>Regular Expression</b>	Regular Expression	Regular Expression	<b>c</b>	<b>C</b>
5	Lexical Analysis	<b>Lexical Analysis</b>	Quiz#1	Lexical Analysis	<b>a</b>	<b>k</b>
6	Lexical Analysis	<b>Lexical Analysis</b>	Lexical Analysis	Lexical Analysis	<b>d</b>	<b>S</b>
7	Context Free Grammar	<b>Context Free Grammar</b>	Context Free Grammar	Context Free Grammar	<b>a</b>	<b>k</b>
8	Context Free Grammar	<b>Context Free Grammar</b>	Context Free Grammar	Context Free Grammar	<b>c</b>	<b>C</b>
9	Syntax-Directed Translation	<b>Syntax-Directed Translation</b>	Midterm Exam	Syntax-Directed Translation	<b>f</b>	<b>C</b>
10	Top-Down Parsing	<b>Top-Down Parsing</b>	Top-Down Parsing	Top-Down Parsing	<b>d</b>	<b>C</b>
11	Top-Down Parsing	<b>Top-Down Parsing</b>	Bottom-Up parsers	Top-Down Parsing	<b>e</b>	<b>C</b>
12	Bottom-Up parsers	<b>Bottom-Up parsers</b>	Quiz#2	Bottom-Up parsers	<b>e</b>	<b>C</b>
13	Code Generation	<b>Code Generation</b>	Code Generation	Code Generation	<b>f</b>	<b>S</b>
14	Code Generation	<b>Code Generation</b>	Code Generation	Code Generation	<b>b</b>	<b>S</b>
15	Final Exam					

\* **K: Knowledge, S: Skills, C: Competency**

## Teaching Methods and Assignments:

**Development of ILOs is promoted through the following teaching and learning methods:**

- **Interactive videos**
- **Practice Labs**
- **Discussion Forums**
- **Quizzes**
- **Other Interactive online activities**
- **Reports**

## Course Policies:

A- Attendance policies:

The maximum allowed absences is 15% of the lectures.

B- Absences from exams and handing in assignments on time:

Midterm exam can be retaken based on approval of excuse by the instructor's discretion.

Not handing assignment on time will incur penalties.

C- Academic Health and safety procedures

D- Honesty policy regarding cheating, plagiarism, and misbehaviour:

Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.

E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.

- Online Activities (Course Videos, Practice labs, Discussion Forums, Quizzes) 20%
- Midterm 30%
- Final Exam 50%

F- Available university services that support achievement in the course: **E-Learning Platform, Labs, Library.**


### Required equipment:

- PC / Laptop with webcam and mic
- Internet Connection
- Access to the IU E-Learning Platform at: <https://elearn.iu.edu.jo/>
- E-learning plan
- Satisfaction questionnaires for online and face-to-face learning
- Software for e-learning
- Training

### Assessment Tools implemented in the course:

- Final Exam
- Midterm Exam
- Quizzes
- Homework
- Practice Labs
- Discussion Forums
- Periodic reports for learning assessment
- Improvement plans for online or face-to-face teaching
- Others:.....

### Responsible Persons and their Signatures:

<b>Course Coordinator</b>	<b>Dr. Ayad Al-Zobaydi</b>	<b>Completed Date</b>	<b>18 / 3 / 2022</b>	
		<b>Signature</b>		
<b>Received by</b> (Department Head)		<b>Received Date</b>	/ /	
		<b>Signature</b>		